



July 21, 2016

Smita Sumbaly Weston Solutions, Inc 1090 King Georges Post Road Edison, NJ 08837

RE: Project: 365A

Pace Project No.: 30186684

# Dear Smita Sumbaly:

Enclosed are the analytical results for sample(s) received by the laboratory on June 16, 2016. The results relate only to the samples included in this report. Results reported herein conform to the most current TNI standards and the laboratory's Quality Assurance Manual, where applicable, unless otherwise noted in the body of the report.

If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jacquelyn Collins for

Suguely allins

Carin Ferris

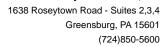
carin.ferris@pacelabs.com

**Project Manager** 

**Enclosures** 

cc: Ben Nwosu, Weston Solutions, Inc.







### **CERTIFICATIONS**

Project: 365A
Pace Project No.: 30186684

### Pennsylvania Certification IDs

1638 Roseytown Rd Suites 2,3&4, Greensburg, PA 15601

L-A-B DOD-ELAP Accreditation #: L2417

Alabama Certification #: 41590 Arizona Certification #: AZ0734

**Arkansas Certification** 

California Certification #: 04222CA

Colorado Certification

Connecticut Certification #: PH-0694

**Delaware Certification** 

Florida/TNI Certification #: E87683 Georgia Certification #: C040

Guam Certification
Hawaii Certification
Idaho Certification
Illinois Certification
Indiana Certification

Iowa Certification #: 391

Kansas/TNI Certification #: E-10358 Kentucky Certification #: 90133

Louisiana DHH/TNI Certification #: LA140008 Louisiana DEQ/TNI Certification #: 4086

Maine Certification #: PA00091 Maryland Certification #: 308

Massachusetts Certification #: M-PA1457

Michigan/PADEP Certification Missouri Certification #: 235 Nebraska Certification #: NE-05-29-14 Nevada Certification #: PA014572015-1 New Hampshire/TNI Certification #: 2976 New Jersey/TNI Certification #: PA 051 New Mexico Certification #: PA01457 New York/TNI Certification #: 10888

Montana Certification #: Cert 0082

North Carolina Certification #: 42706 North Dakota Certification #: R-190 Oregon/TNI Certification #: PA200002 Pennsylvania/TNI Certification #: 65-00282 Puerto Rico Certification #: PA01457

South Dakota Certification

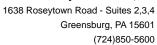
Tennessee Certification #: TN2867

Rhode Island Certification #: 65-00282

Texas/TNI Certification #: T104704188-14-8
Utah/TNI Certification #: PA014572015-5
USDA Soil Permit #: P330-14-00213
Vermont Dept. of Health: ID# VT-0282
Virgin Island/PADEP Certification
Virginia/VELAP Certification #: 460198
Washington Certification #: C868
West Virginia DEP Certification #: 143
West Virginia DHHR Certification #: 9964C

Wisconsin Certification

Wyoming Certification #: 8TMS-L





# **SAMPLE SUMMARY**

Project: 365A
Pace Project No.: 30186684

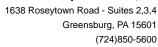
Lab ID	Sample ID	Matrix	Date Collected	Date Received
30186684001	N002-CC003-01	Solid	06/14/16 11:45	06/16/16 09:45
30186684002	N002-CC006-01	Solid	06/14/16 11:00	06/16/16 09:45
30186684003	N002-CC006-02	Solid	06/14/16 11:00	06/16/16 09:45
30186684004	N002-CC007-01	Solid	06/14/16 13:00	06/16/16 09:45
30186684005	N002-CC011-01	Solid	06/14/16 14:00	06/16/16 09:45
30186684006	N002-CC013-01	Solid	06/14/16 14:45	06/16/16 09:45
30186684007	N002-CC016-01	Solid	06/14/16 15:30	06/16/16 09:45
30186684008	RB-N-160615	Water	06/14/16 16:30	06/16/16 09:45



# **SAMPLE ANALYTE COUNT**

Project: 365A
Pace Project No.: 30186684

Lab ID	Sample ID	Method	Analysts	Analytes Reported
30186684001	N002-CC003-01	EPA 901.1	MAH	1
		EPA 901.1	MAH	9
		HSL-300	JC2	6
30186684002	N002-CC006-01	EPA 901.1	MAH	1
		EPA 901.1	MAH	9
		HSL-300	JC2	6
30186684003	N002-CC006-02	EPA 901.1	MAH	1
		EPA 901.1	MAH	9
		HSL-300	JC2	6
30186684004	N002-CC007-01	EPA 901.1	MAH	1
		EPA 901.1	MAH	9
		HSL-300	JC2	6
30186684005	N002-CC011-01	EPA 901.1	MAH	1
		EPA 901.1	MAH	9
		HSL-300	JC2	6
30186684006	N002-CC013-01	EPA 901.1	MAH	1
		EPA 901.1	MAH	9
		HSL-300	JC2	6
30186684007	N002-CC016-01	EPA 901.1	MAH	1
		EPA 901.1	MAH	9
		HSL-300	JC2	6
30186684008	RB-N-160615	EPA 903.1	WRR	1
		EPA 904.0	JLW	1
		HSL-300	LAL	6





Project: 365A
Pace Project No.: 30186684

Method: EPA 901.1

**Description:** 901.1 Gamma Spec **Client:** Weston Solutions, Inc. (NJ)

Date: July 21, 2016

### **General Information:**

7 samples were analyzed for EPA 901.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

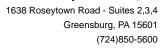
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.





Project: 365A Pace Project No.: 30186684

Method: EPA 901.1

**Description:** 901.1 Gamma Spec INGROWTH **Client:** Weston Solutions, Inc. (NJ)

Date: July 21, 2016

### **General Information:**

7 samples were analyzed for EPA 901.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

### Sample Preparation:

The samples were prepared in accordance with EPA 901.1 with any exceptions noted below.

### Method Blank:

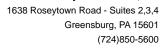
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### Laboratory Control Spike:

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.





Project: 365A
Pace Project No.: 30186684

Method: EPA 903.1

Description: 903.1 Radium 226

Client: Weston Solutions, Inc. (NJ)

Date: July 21, 2016

### **General Information:**

1 sample was analyzed for EPA 903.1. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

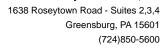
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.





Project: 365A
Pace Project No.: 30186684

Method: EPA 904.0

Description: 904.0 Radium 228

Client: Weston Solutions, Inc. (NJ)

Date: July 21, 2016

### **General Information:**

1 sample was analyzed for EPA 904.0. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

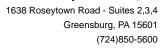
All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.





Project: 365A
Pace Project No.: 30186684

Method: HSL-300

**Description:** HSL300(AS) Actinides **Client:** Weston Solutions, Inc. (NJ)

**Date:** July 21, 2016

### **General Information:**

7 samples were analyzed for HSL-300. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

#### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

#### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

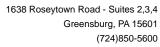
### Additional Comments:

**Analyte Comments:** 

QC Batch: 224738

N2: The lab does not hold TNI accreditation for this parameter.

- BLANK (Lab ID: 1100395)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- N002-CC003-01 (Lab ID: 30186684001)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- N002-CC006-01 (Lab ID: 30186684002)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- N002-CC006-02 (Lab ID: 30186684003)
  - Thorium-228
  - Thorium-230





Project: 365A
Pace Project No.: 30186684

Method: HSL-300

**Description:** HSL300(AS) Actinides **Client:** Weston Solutions, Inc. (NJ)

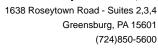
Date: July 21, 2016

Analyte Comments:

QC Batch: 224738

N2: The lab does not hold TNI accreditation for this parameter.

- N002-CC006-02 (Lab ID: 30186684003)
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- N002-CC007-01 (Lab ID: 30186684004)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- N002-CC011-01 (Lab ID: 30186684005)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- N002-CC013-01 (Lab ID: 30186684006)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- N002-CC016-01 (Lab ID: 30186684007)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236





Project: 365A
Pace Project No.: 30186684

Method: HSL-300

**Description:** HSL300(AS) Actinides **Client:** Weston Solutions, Inc. (NJ)

Date: July 21, 2016

### **General Information:**

1 sample was analyzed for HSL-300. All samples were received in acceptable condition with any exceptions noted below or on the chain-of custody and/or the sample condition upon receipt form (SCUR) attached at the end of this report.

#### **Hold Time:**

The samples were analyzed within the method required hold times with any exceptions noted below.

### Method Blank:

All analytes were below the report limit in the method blank, where applicable, with any exceptions noted below.

### **Laboratory Control Spike:**

All laboratory control spike compounds were within QC limits with any exceptions noted below.

#### Matrix Spikes:

All percent recoveries and relative percent differences (RPDs) were within acceptance criteria with any exceptions noted below.

### **Additional Comments:**

**Analyte Comments:** 

QC Batch: 224124

N2: The lab does not hold TNI accreditation for this parameter.

- BLANK (Lab ID: 1096884)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236
- RB-N-160615 (Lab ID: 30186684008)
  - Thorium-228
  - Thorium-230
  - Thorium-232
  - U-233/234
  - Uranium-238
  - U-235/236

This data package has been reviewed for quality and completeness and is approved for release.



Project: 365A
Pace Project No.: 30186684

Sample: N002-CC003-01 Lab ID: 30186684001 Collected: 06/14/16 11:45 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	3.903 ± 1.648 (1.605) C:NA T:NA	pCi/g	06/24/16 15:27	13982-63-3	
Bismuth-212	EPA 901.1	1.146 ± 1.595 (1.747) C:NA T:NA	pCi/g	07/14/16 13:51	14913-49-6	
Lead-210	EPA 901.1	0.991 ± 2.308 (3.076) C:NA T:NA	pCi/g	07/14/16 13:51	14255-04-0	
Lead-212	EPA 901.1	0.623 ± 0.181 (0.167) C:NA T:NA	pCi/g	07/14/16 13:51	15092-94-1	
Potassium-40	EPA 901.1	7.051 ± 2.401 (1.772) C:NA T:NA	pCi/g	07/14/16 13:51	13966-00-2	
Radium-226	EPA 901.1	1.075 ± 0.251 (0.192) C:NA T:NA	pCi/g	07/14/16 13:51	13982-63-3	
Radium-228	EPA 901.1	0.452 ± 0.415 (0.640) C:NA T:NA	pCi/g	07/14/16 13:51	15262-20-1	
Thallium-208	EPA 901.1	0.253 ± 0.115 (0.105) C:NA T:NA	pCi/g	07/14/16 13:51	14913-50-9	
Thorium-234	EPA 901.1	0.521 ± 1.717 (2.240) C:NA T:NA	pCi/g	07/14/16 13:51	15065-10-8	
Uranium-235	EPA 901.1	0.148 ± 0.102 (0.125) C:NA T:NA	pCi/g	07/14/16 13:51	15117-96-1	
Thorium-228	HSL-300	0.589 ± 0.167 (0.125) C:NA T:65%	pCi/g	07/05/16 12:58	14274-82-9	N2
Thorium-230	HSL-300	0.719 ± 0.181 (0.066) C:NA T:65%	pCi/g	07/05/16 12:58	14269-63-7	N2
Thorium-232	HSL-300	0.358 ± 0.113 (0.019) C:NA T:65%	pCi/g	07/05/16 12:58	7440-29-1	N2
U-233/234	HSL-300	0.692 ± 0.232 (0.121) C:NA T:86%	pCi/g	07/05/16 07:46		N2
U-235/236	HSL-300	0.051 ± 0.073 (0.120) C:NA T:86%	pCi/g	07/05/16 07:46		N2
Uranium-238	HSL-300	0.792 ± 0.251 (0.103) C:NA T:86%	pCi/g	07/05/16 07:46		N2

 Sample:
 N002-CC006-01
 Lab ID:
 30186684002
 Collected:
 06/14/16 11:00
 Received:
 06/16/16 09:45
 Matrix:
 Solid

 PWS:
 Site ID:
 Sample Type:

Results reported on a "drv-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	1.293 ± 1.984 (2.533) C:NA T:NA	pCi/g	06/24/16 15:44	13982-63-3	
Bismuth-212	EPA 901.1	1.586 ± 1.422 (1.468) C:NA T:NA	pCi/g	07/14/16 14:07	14913-49-6	
Lead-210	EPA 901.1	1.804 ± 2.744 (3.555) C:NA T:NA	pCi/g	07/14/16 14:07	14255-04-0	
Lead-212	EPA 901.1	0.554 ± 0.195 (0.224) C:NA T:NA	pCi/g	07/14/16 14:07	15092-94-1	
Potassium-40	EPA 901.1	7.062 ± 2.141 (1.358) C:NA T:NA	pCi/g	07/14/16 14:07	13966-00-2	
Radium-226	EPA 901.1	1.125 ± 0.276 (0.259) C:NA T:NA	pCi/g	07/14/16 14:07	13982-63-3	
Radium-228	EPA 901.1	0.531 ± 0.403 (0.611)	pCi/g	07/14/16 14:07	15262-20-1	



Project: 365A
Pace Project No.: 30186684

Sample: N002-CC006-01 Lab ID: 30186684002 Collected: 06/14/16 11:00 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

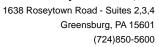
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thallium-208	EPA 901.1	0.232 ± 0.121 (0.118) C:NA T:NA	pCi/g	07/14/16 14:07	14913-50-9	
Thorium-234	EPA 901.1	1.570 ± 1.613 (2.372) C:NA T:NA	pCi/g	07/14/16 14:07	15065-10-8	
Uranium-235	EPA 901.1	0.094 ± 0.135 (0.171) C:NA T:NA	pCi/g	07/14/16 14:07	15117-96-1	
Thorium-228	HSL-300	0.690 ± 0.185 (0.101) C:NA T:59%	pCi/g	07/05/16 12:58	14274-82-9	N2
Thorium-230	HSL-300	0.806 ± 0.200 (0.051) C:NA T:59%	pCi/g	07/05/16 12:58	14269-63-7	N2
Thorium-232	HSL-300	0.355 ± 0.117 (0.050) C:NA T:59%	pCi/g	07/05/16 12:58	7440-29-1	N2
U-233/234	HSL-300	0.922 ± 0.280 (0.095) C:NA T:81%	pCi/g	07/05/16 07:46		N2
U-235/236	HSL-300	0.079 ± 0.084 (0.104) C:NA T:81%	pCi/g	07/05/16 07:46		N2
Uranium-238	HSL-300	0.870 ± 0.270 (0.107) C:NA T:81%	pCi/g	07/05/16 07:46		N2

 Sample:
 N002-CC006-02
 Lab ID:
 30186684003
 Collected:
 06/14/16 11:00
 Received:
 06/16/16 09:45
 Matrix:
 Solid

 PWS:
 Site ID:
 Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	2.612 ± 1.624 (1.873) C:NA T:NA	pCi/g	06/24/16 15:47	13982-63-3	
Bismuth-212	EPA 901.1	1.668 ± 1.379 (1.590) C:NA T:NA	pCi/g	07/14/16 14:26	14913-49-6	
Lead-210	EPA 901.1	0.151 ± 3.017 (4.138) C:NA T:NA	pCi/g	07/14/16 14:26	14255-04-0	
Lead-212	EPA 901.1	0.626 ± 0.220 (0.256) C:NA T:NA	pCi/g	07/14/16 14:26	15092-94-1	
Potassium-40	EPA 901.1	6.952 ± 2.673 (2.129) C:NA T:NA	pCi/g	07/14/16 14:26	13966-00-2	
Radium-226	EPA 901.1	1.141 ± 0.289 (0.161) C:NA T:NA	pCi/g	07/14/16 14:26	13982-63-3	
Radium-228	EPA 901.1	0.513 ± 0.383 (0.528) C:NA T:NA	pCi/g	07/14/16 14:26	15262-20-1	
Thallium-208	EPA 901.1	0.387 ± 0.133 (0.093) C:NA T:NA	pCi/g	07/14/16 14:26	14913-50-9	
Thorium-234	EPA 901.1	0.000 ± 0.926 (2.438) C:NA T:NA	pCi/g	07/14/16 14:26	15065-10-8	
Uranium-235	EPA 901.1	0.185 ± 0.128 (0.154)	pCi/g	07/14/16 14:26	15117-96-1	
Thorium-228	HSL-300	C:NA T:NA 0.504 ± 0.167 (0.157)	pCi/g	07/05/16 12:58	14274-82-9	N2
Thorium-230	HSL-300	C:NA T:56% 0.850 ± 0.213 (0.067)	pCi/g	07/05/16 12:58	14269-63-7	N2
Thorium-232	HSL-300	C:NA T:56% 0.396 ± 0.128 (0.022)	pCi/g	07/05/16 12:58	7440-29-1	N2
U-233/234	HSL-300	C:NA T:56% 0.651 ± 0.222 (0.177) C:NA T:101%	pCi/g	07/05/16 07:46		N2





Project: 365A
Pace Project No.: 30186684

Sample: N002-CC006-02 Lab ID: 30186684003 Collected: 06/14/16 11:00 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
U-235/236	HSL-300	0.028 ± 0.066 (0.109) C:NA T:101%	pCi/g	07/05/16 07:46		N2
Uranium-238	HSL-300	0.919 ± 0.264 (0.083) C:NA T:101%	pCi/g	07/05/16 07:46		N2

Sample: N002-CC007-01 Lab ID: 30186684004 Collected: 06/14/16 13:00 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	1.482 ± 1.369 (1.895) C:NA T:NA	pCi/g	06/24/16 16:00	13982-63-3	
Bismuth-212	EPA 901.1	0.647 ± 1.180 (1.369) C:NA T:NA	pCi/g	07/14/16 14:43	14913-49-6	
Lead-210	EPA 901.1	0.000 ± 0.675 (3.904) C:NA T:NA	pCi/g	07/14/16 14:43	14255-04-0	
Lead-212	EPA 901.1	0.735 ± 0.202 (0.179) C:NA T:NA	pCi/g	07/14/16 14:43	15092-94-1	
Potassium-40	EPA 901.1	8.334 ± 2.282 (1.267) C:NA T:NA	pCi/g	07/14/16 14:43	13966-00-2	
Radium-226	EPA 901.1	1.147 ± 0.250 (0.252) C:NA T:NA	pCi/g	07/14/16 14:43	13982-63-3	
Radium-228	EPA 901.1	0.480 ± 0.354 (0.813) C:NA T:NA	pCi/g	07/14/16 14:43	15262-20-1	
Thallium-208	EPA 901.1	0.259 ± 0.101 (0.080) C:NA T:NA	pCi/g	07/14/16 14:43	14913-50-9	
Thorium-234	EPA 901.1	0.642 ± 2.095 (2.699) C:NA T:NA	pCi/g	07/14/16 14:43	15065-10-8	
Uranium-235	EPA 901.1	0.188 ± 0.136 (0.135) C:NA T:NA	pCi/g	07/14/16 14:43	15117-96-1	
Thorium-228	HSL-300	0.506 ± 0.157 (0.123) C:NA T:62%	pCi/g	07/05/16 12:58	14274-82-9	N2
Thorium-230	HSL-300	0.490 ± 0.158 (0.146) C:NA T:62%	pCi/g	07/05/16 12:58	14269-63-7	N2
Thorium-232	HSL-300	0.486 ± 0.141 (0.020) C:NA T:62%	pCi/g	07/05/16 12:58	7440-29-1	N2
U-233/234	HSL-300	0.457 ± 0.194 (0.216) C:NA T:94%	pCi/g	07/05/16 07:46		N2
U-235/236	HSL-300	0.053 ± 0.069 (0.095) C:NA T:94%	pCi/g	07/05/16 07:46		N2
Uranium-238	HSL-300	0.683 ± 0.223 (0.073) C:NA T:94%	pCi/g	07/05/16 07:46		N2

 Sample:
 N002-CC011-01
 Lab ID:
 30186684005
 Collected:
 06/14/16 14:00
 Received:
 06/16/16 09:45
 Matrix:
 Solid

 PWS:
 Site ID:
 Sample Type:

Results reported on a "dry-weight" basis

 Parameters
 Method
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 CAS No.
 Qual

 Radium-226
 EPA 901.1
 1.088 ± 1.668 (2.063) (2.063) (C:NA T:NA)
 pCi/g
 06/24/16 16:03 (13982-63-3) (2.063-3



Project: 365A
Pace Project No.: 30186684

Sample: N002-CC011-01 Lab ID: 30186684005 Collected: 06/14/16 14:00 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Bismuth-212	EPA 901.1	0.157 ± 1.750 (2.061) C:NA T:NA	pCi/g	07/14/16 14:59	14913-49-6	
Lead-210	EPA 901.1	0.068 ± 2.198 (3.060) C:NA T:NA	pCi/g	07/14/16 14:59	14255-04-0	
Lead-212	EPA 901.1	0.469 ± 0.167 (0.188) C:NA T:NA	pCi/g	07/14/16 14:59	15092-94-1	
Potassium-40	EPA 901.1	8.851 ± 2.326 (1.218) C:NA T:NA	pCi/g	07/14/16 14:59	13966-00-2	
Radium-226	EPA 901.1	0.519 ± 0.184 (0.134) C:NA T:NA	pCi/g	07/14/16 14:59	13982-63-3	
Radium-228	EPA 901.1	0.649 ± 0.255 (0.269) C:NA T:NA	pCi/g	07/14/16 14:59	15262-20-1	
Thallium-208	EPA 901.1	0.033 ± 0.131 (0.161) C:NA T:NA	pCi/g	07/14/16 14:59	14913-50-9	
Thorium-234	EPA 901.1	0.936 ± 1.333 (1.717) C:NA T:NA	pCi/g	07/14/16 14:59	15065-10-8	
Uranium-235	EPA 901.1	0.053 ± 0.119 (0.153) C:NA T:NA	pCi/g	07/14/16 14:59	15117-96-1	
Thorium-228	HSL-300	0.341 ± 0.156 (0.202) C:NA T:51%	pCi/g	07/05/16 12:58	14274-82-9	N2
Thorium-230	HSL-300	0.351 ± 0.159 (0.206) C:NA T:51%	pCi/g	07/05/16 12:58	14269-63-7	N2
Thorium-232	HSL-300	0.301 ± 0.112 (0.024) C:NA T:51%	pCi/g	07/05/16 12:58	7440-29-1	N2
U-233/234	HSL-300	0.425 ± 0.181 (0.086) C:NA T:79%	pCi/g	07/05/16 07:46		N2
U-235/236	HSL-300	0.062 ± 0.081 (0.112) C:NA T:79%	pCi/g	07/05/16 07:46		N2
Uranium-238	HSL-300	0.533 ± 0.207 (0.102) C:NA T:79%	pCi/g	07/05/16 07:46		N2

Sample: N002-CC013-01 Lab ID: 30186684006 Collected: 06/14/16 14:45 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	1.722 ± 1.055 (1.243) C:NA T:NA	pCi/g	06/24/16 16:16	13982-63-3	
Bismuth-212	EPA 901.1	0.820 ± 0.856 (1.849) C:NA T:NA	pCi/g	07/14/16 15:15	14913-49-6	
Lead-210	EPA 901.1	0.000 ± 1.427 (3.175) C:NA T:NA	pCi/g	07/14/16 15:15	14255-04-0	
Lead-212	EPA 901.1	0.335 ± 0.132 (0.155) C:NA T:NA	pCi/g	07/14/16 15:15	15092-94-1	
Potassium-40	EPA 901.1	7.564 ± 2.027 (1.093) C:NA T:NA	pCi/g	07/14/16 15:15	13966-00-2	
Radium-226	EPA 901.1	0.624 ± 0.150 (0.175) C:NA T:NA	pCi/g	07/14/16 15:15	13982-63-3	
Radium-228	EPA 901.1	0.395 ± 0.331 (0.392) C:NA T:NA	pCi/g	07/14/16 15:15	15262-20-1	
Thallium-208	EPA 901.1	0.066 ± 0.094 (0.114) C:NA T:NA	pCi/g	07/14/16 15:15	14913-50-9	



Project: 365A
Pace Project No.: 30186684

Sample: N002-CC013-01 Lab ID: 30186684006 Collected: 06/14/16 14:45 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

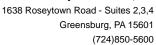
Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Thorium-234	EPA 901.1	1.377 ± 1.160 (1.908) C:NA T:NA	pCi/g	07/14/16 15:15	15065-10-8	-,
Uranium-235	EPA 901.1	0.148 ± 0.073 (0.082) C:NA T:NA	pCi/g	07/14/16 15:15	15117-96-1	
Thorium-228	HSL-300	0.213 ± 0.125 (0.180) C:NA T:57%	pCi/g	07/05/16 12:58	14274-82-9	N2
Thorium-230	HSL-300	0.348 ± 0.121 (0.056) C:NA T:57%	pCi/g	07/05/16 12:58	14269-63-7	N2
Thorium-232	HSL-300	0.307 ± 0.112 (0.056) C:NA T:57%	pCi/g	07/05/16 12:58	7440-29-1	N2
U-233/234	HSL-300	0.409 ± 0.185 (0.203) C:NA T:89%	pCi/g	07/05/16 07:46		N2
U-235/236	HSL-300	0.082 ± 0.081 (0.056) C:NA T:89%	pCi/g	07/05/16 07:46		N2
Uranium-238	HSL-300	0.433 ± 0.177 (0.093) C:NA T:89%	pCi/g	07/05/16 07:46		N2

Sample: N002-CC016-01 Lab ID: 30186684007 Collected: 06/14/16 15:30 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

Parameters	Method	Act ± Unc (MDC) Carr Trac	Units	Analyzed	CAS No.	Qual
Radium-226	EPA 901.1	0.310 ± 1.917 (2.468) C:NA T:NA	pCi/g	06/24/16 16:19	13982-63-3	
Bismuth-212	EPA 901.1	0.722 ± 1.802 (2.079) C:NA T:NA	pCi/g	07/14/16 15:32	14913-49-6	
Lead-210	EPA 901.1	3.285 ± 2.642 (3.240) C:NA T:NA	pCi/g	07/14/16 15:32	14255-04-0	
Lead-212	EPA 901.1	0.407 ± 0.169 (0.202) C:NA T:NA	pCi/g	07/14/16 15:32	15092-94-1	
Potassium-40	EPA 901.1	11.593 ± 2.939 (1.457) C:NA T:NA	pCi/g	07/14/16 15:32	13966-00-2	
Radium-226	EPA 901.1	0.739 ± 0.218 (0.221) C:NA T:NA	pCi/g	07/14/16 15:32	13982-63-3	
Radium-228	EPA 901.1	0.270 ± 0.361 (0.523) C:NA T:NA	pCi/g	07/14/16 15:32	15262-20-1	
Thallium-208	EPA 901.1	0.046 ± 0.119 (0.153) C:NA T:NA	pCi/g	07/14/16 15:32	14913-50-9	
Thorium-234	EPA 901.1	0.882 ± 1.692 (2.206) C:NA T:NA	pCi/g	07/14/16 15:32	15065-10-8	
Uranium-235	EPA 901.1	0.184 ± 0.097 (0.111) C:NA T:NA	pCi/g	07/14/16 15:32	15117-96-1	
Thorium-228	HSL-300	0.325 ± 0.140 (0.153) C:NA T:47%	pCi/g	07/05/16 12:58	14274-82-9	N2
Thorium-230	HSL-300	0.280 ± 0.137 (0.173) C:NA T:47%	pCi/g	07/05/16 12:58	14269-63-7	N2
Thorium-232	HSL-300	0.221 ± 0.097 (0.026) C:NA T:47%	pCi/g	07/05/16 12:58	7440-29-1	N2
U-233/234	HSL-300	0.403 ± 0.159 (0.097) C:NA T:98%	pCi/g	07/05/16 07:46		N2
U-235/236	HSL-300	0.052 ± 0.063 (0.047) C:NA T:98%	pCi/g	07/05/16 07:46		N2





Project: 365A Pace Project No.: 30186684

Sample: N002-CC016-01 Lab ID: 30186684007 Collected: 06/14/16 15:30 Received: 06/16/16 09:45 Matrix: Solid

PWS: Site ID: Sample Type:

Results reported on a "dry-weight" basis

 Parameters
 Method
 Act ± Unc (MDC) Carr Trac
 Units
 Analyzed
 CAS No.
 Qual

 Uranium-238
 HSL-300
 0.469 ± 0.171 (0.036) (

Sample: RB-N-160615 Lab ID: 30186684008 Collected: 06/14/16 16:30 Received: 06/16/16 09:45 Matrix: Water PWS: Site ID: Sample Type: Method Act ± Unc (MDC) Carr Trac **Parameters** Units Analyzed CAS No. Qual EPA 903.1 -0.092 ± 0.420 (0.855) Radium-226 pCi/L 07/14/16 13:11 13982-63-3 C:NA T:82% EPA 904.0 -0.0307 ± 0.320 (0.752) Radium-228 pCi/L 07/12/16 12:15 15262-20-1 C:81% T:84% 0.056 ± 0.077 (0.129) HSL-300 Thorium-228 pCi/L 06/24/16 20:41 14274-82-9 N2 C:NA T:67% 0.000 ± 0.037 (0.082) Thorium-230 HSL-300 pCi/L 06/24/16 20:41 14269-63-7 N2 C:NA T:67% HSL-300 Thorium-232  $-0.015 \pm 0.035 \quad (0.082)$ pCi/L 06/24/16 20:41 7440-29-1 N2 C:NA T:67% U-233/234 HSL-300  $0.009 \pm 0.036 \quad (0.071)$ N2 pCi/L 06/25/16 17:10 C:NA T:94% 0.009 ± 0.032 (0.052) HSL-300 U-235/236 pCi/L 06/25/16 17:10 N2 C:NA T:94% HSL-300  $0.038 \pm 0.029 \quad (0.015)$ Uranium-238 pCi/L 06/25/16 17:10 N2 C:NA T:94%



1638 Roseytown Road - Suites 2,3,4 Greensburg, PA 15601 (724)850-5600

### **QUALITY CONTROL - RADIOCHEMISTRY**

Project: 365A
Pace Project No.: 30186684

QC Batch: 224193 Analysis Method: EPA 901.1

QC Batch Method: EPA 901.1 Analysis Description: 901.1 Gamma Spec

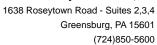
Associated Lab Samples: 30186684001, 30186684002, 30186684003, 30186684004, 30186684005, 30186684006, 30186684007

METHOD BLANK: 1097118 Matrix: Solid

Associated Lab Samples: 30186684001, 30186684002, 30186684003, 30186684004, 30186684005, 30186684006, 30186684007

ParameterAct  $\pm$  Unc (MDC) Carr TracUnitsAnalyzedQualifiersRadium-2260.497  $\pm$  0.998 (1.457) C:NA T:NApCi/g06/23/16 11:26

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.





Project: 365A
Pace Project No.: 30186684

QC Batch: 224738 Analysis Method: HSL-300

QC Batch Method: HSL-300 Analysis Description: HSL300(AS) Actinides

Associated Lab Samples: 30186684001, 30186684002, 30186684003, 30186684004, 30186684005, 30186684006, 30186684007

METHOD BLANK: 1100395 Matrix: Solid

Associated Lab Samples: 30186684001, 30186684002, 30186684003, 30186684004, 30186684005, 30186684006, 30186684007

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Thorium-228	0.030 ± 0.066 (0.146) C:NA T:81%	pCi/g	07/06/16 07:43	N2
Thorium-230	0.018 ± 0.048 (0.113) C:NA T:81%	pCi/g	07/06/16 07:43	N2
Thorium-232	0.009 ± 0.047 (0.066) C:NA T:81%	pCi/g	07/06/16 07:43	N2
U-233/234	0.059 ± 0.070 (0.127) C:NA T:100%	pCi/g	07/05/16 07:46	N2
U-235/236	0.013 ± 0.060 (0.083) C:NA T:100%	pCi/g	07/05/16 07:46	N2
Uranium-238	0.023 ± 0.046 (0.064) C:NA T:100%	pCi/g	07/05/16 07:46	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.





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### **QUALITY CONTROL - RADIOCHEMISTRY**

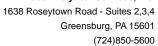
Project: 365A
Pace Project No.: 30186684

QC Batch: 224739 Analysis Method: EPA 901.1

QC Batch Method: EPA 901.1 Analysis Description: 901.1 Gamma Spec Ingrowth

Associated Lab Samples: 30186684001, 30186684002, 30186684003, 30186684004, 30186684005, 30186684006, 30186684007

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.





Project:

365A

Pace Project No.:

QC Batch Method:

30186684

QC Batch:

225092

EPA 903.1

Analysis Method:

EPA 903.1

Analysis Description:

903.1 Radium-226

Associated Lab Samples:

30186684008

METHOD BLANK: 1102439

Matrix: Water

Associated Lab Samples:

30186684008

Parameter

Act ± Unc (MDC) Carr Trac

Units pCi/L Analyzed

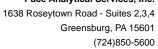
Qualifiers

Radium-226

-0.033 ± 0.485 (0.948) C:NA T:91%

07/14/16 12:16

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.





Project: 365A
Pace Project No.: 30186684

QC Batch: 224124 Analysis Method: HSL-300

QC Batch Method: HSL-300 Analysis Description: HSL300(AS) Actinides

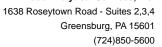
Associated Lab Samples: 30186684008

METHOD BLANK: 1096884 Matrix: Water

Associated Lab Samples: 30186684008

Parameter	Act ± Unc (MDC) Carr Trac	Units	Analyzed	Qualifiers
Thorium-228	0.046 ± 0.072 (0.124) C:NA T:76%	pCi/L	06/24/16 20:41	N2
Thorium-230	-0.020 ± 0.039 (0.093) C:NA T:76%	pCi/L	06/24/16 20:41	N2
Thorium-232	0.000 ± 0.030 (0.048) C:NA T:76%	pCi/L	06/24/16 20:41	N2
U-233/234	-0.041 ± 0.058 (0.122) C:NA T:97%	pCi/L	06/25/16 17:10	N2
U-235/236	0.020 ± 0.031 (0.018) C:NA T:97%	pCi/L	06/25/16 17:10	N2
Uranium-238	0.028 ± 0.031 (0.048) C:NA T:97%	pCi/L	06/25/16 17:10	N2

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.





Project:

365A

Pace Project No.:

30186684

QC Batch:

225096

Analysis Method:

EPA 904.0

QC Batch Method: EPA 904.0

Analysis Description:

904.0 Radium 228

Associated Lab Samples:

30186684008

METHOD BLANK: 1102452

Matrix: Water

Associated Lab Samples:

30186684008

Parameter

Act ± Unc (MDC) Carr Trac

Units

Analyzed

Qualifiers

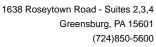
Radium-228

0.254 ± 0.320 (0.678) C:81% T:84%

pCi/L

07/12/16 12:15

Results presented on this page are in the units indicated by the "Units" column except where an alternate unit is presented to the right of the result.





### **QUALIFIERS**

Project: 365A
Pace Project No.: 30186684

#### **DEFINITIONS**

DF - Dilution Factor, if reported, represents the factor applied to the reported data due to dilution of the sample aliquot.

ND - Not Detected at or above adjusted reporting limit.

J - Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.

MDL - Adjusted Method Detection Limit.

PQL - Practical Quantitation Limit.

RL - Reporting Limit.

S - Surrogate

1,2-Diphenylhydrazine decomposes to and cannot be separated from Azobenzene using Method 8270. The result for each analyte is a combined concentration.

Consistent with EPA guidelines, unrounded data are displayed and have been used to calculate % recovery and RPD values.

LCS(D) - Laboratory Control Sample (Duplicate)

MS(D) - Matrix Spike (Duplicate)

**DUP - Sample Duplicate** 

RPD - Relative Percent Difference

NC - Not Calculable.

SG - Silica Gel - Clean-Up

U - Indicates the compound was analyzed for, but not detected.

N-Nitrosodiphenylamine decomposes and cannot be separated from Diphenylamine using Method 8270. The result reported for each analyte is a combined concentration.

Act - Activity

Unc - Uncertainty: SDWA = 1.96 sigma count uncertainty, all other matrices = Expanded Uncertainty (95% confidence interval). Gamma Spec = Expanded Uncertainty (95.4% Confidence Interval)

(MDC) - Minimum Detectable Concentration

Trac - Tracer Recovery (%)

Carr - Carrier Recovery (%)

Pace Analytical is TNI accredited. Contact your Pace PM for the current list of accredited analytes.

TNI - The NELAC Institute.

#### **ANALYTE QUALIFIERS**

Date: 07/21/2016 10:09 AM

N2 The lab does not hold TNI accreditation for this parameter.

WO#:30186684

Page 1 of 1

USEPA

AirbillNo: 7765 2506 5204 DateShipped: 6/15/2016 CarrierName: FedEx

OF CUSTODY RECORD

Case #: 365A

Contact Name: Peter Lisichenko Contact Phone: 603-512-4350

No: 2-061516-100719-0006

Lab: PACE Analytical Services Lab Contact: Justin Hensley Lab Phone: 724-850-5600

Lab#	Sample #	Sample Date	Sample Time	Analyses	Matrix	Preservative	Lab QC	Numb Cont Container	Container	
	N002-CC003-01	6/14/2016	11:45	Gamma Spec (Modified), Isotopic Th and U	Concrete	None	Z	1	Ziploc Bag	8
	N002-CC006-01	6/14/2016	11:00	Gamma Spec (Modified), Isotopic Th and U	Concrete	None	Z	1	1 Ziploc Bag	8
	N002-CC006-02	6/14/2016	11:00	Gamma Spec (Modified), Isotopic Th and U	Concrete	None	Z	1	Ziploc Bag	8
	N002-CC007-01	6/14/2016	13:00	Gamma Spec (Modified), Isotopic Th and U	Concrete	None	Z	1	Ziploc Bag	S
	N002-CC011-01	6/14/2016	14:00	Gamma Spec (Modified), Isotopic Th and U	Concrete	None	<b>&gt;</b>	2	Ziploc Bag	SQS
	N002-CC013-01	6/14/2016	14:45	Gamma Spec (Modifled), Isotopic Th and U	Concrete	None	Z	1	1 Ziploc Bag	Be
	N002-CC016-01	6/14/2016	15:30	Gamma Spec (Modified), Isotopic Th and U	Concrete	None	z	_	Ziploc Bag	7.00
	RB-N-160615	6/14/2016	16:30	Radium-228	DI Water	HNO3 pH<2	z	1	1   1 L poly	C
	RB-N-160615	6/14/2016	16:30	Radium-226	DI Water	HNO3 pH<2	Z	1	1   1 L poly	2
	RB-N-160615	6/14/2016	16:30	Isotopic Thorium and Uranium	DI Water	HNO3 pH<2	Z	1	1 L poly	)
				***************************************						
										_

SAMPLES TRANSFERRED FROM Special Instructions: Gamma Spectroscopy analysis for concrete samples to include: Ra-226 (in-growth), Ra-226 (186kev peak) Ra-228, K-40, TI-208, BI-212, BI-214, Pb-212, Pb-214, Ra-226, Ra-228, Th-234, U-235, Pb-210, BI-210. Ra-226 (186 kev peak) TAT = 7 days. All other analysis TAT = 42 days.

CHAIN OF CUSTODY#

Email results to s.sumbaly@westonsolutions.com, ben.nwosu@westonsolutions.com, and peter.lisichenko@westonsolutions.com

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Sample Con-	dition Upon Rec	eipt F	?ittst	ourg	jh			
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Pace Analytical	Client Name:	<del>U</del> S	ĔŘ.	41	762/00	Project #		
Courier: Fed Ex Tracking #:	]UPS □USPS □ Clie 2506 5204	ent 🔲	Comm	ercia	Pace Other			
Custody Seal on Coole	r/Box Present: 🗹 yes		no	Sea	ls intact: 🗹 yes	no		
Thermometer Used	NIA	Туре	of Ice:	: We	et Blue (None)			
Cooler Temperature Temp should be above freez	· <del>_ ·</del>	<u> </u> A	·°C	Cor	rection Factor: N			_
Comments:		Yes	No	N/A	$\Box$	Date and Initi contents:	als of person exa	mining <u>レ</u>
Chain of Custody Presen	4.	103	140	14/7				
Chain of Custody Filled C		J			11.		······································	
Chain of Custody Relingu			<del>                                     </del>		2.	<u>.</u>		
		+	1		3.			
Sampler Name & Signatu Sample Labels match CC		17	<u> </u>		4.	-400		
•	r 2	L		<u> </u>	5.			Ì
-Includes date/time/ID/				ī			· · · · · · · · · · · · · · · · · · ·	
Samples Arrived within He		+~	1		6.			
Short Hold Time Analys		1	V		7.			
Rush Turn Around Time Sufficient Volume:	Requested:				8,	****		
——————————————————————————————————————		1			9			
Correct Containers Used:	1.	-	1					
-Pace Containers Used	2(		~				····	
Containers Intact:					11.			
Filtered volume received for All containers needing preserva				<del></del>	12.			
All containers needing preser				1	13.			
exceptions: VOA, coliform, TOC, O&G, Phenolics				•	Initial when completed	Date/time of preservation		
		T			Lot # of added preservative			
leadspace in VOA Vials (	>6mm):			<u> </u>	14.			
rip Blank Present:				<b>√</b>	15.			
rip Blank Custody Seals F	Present			<u> </u>		H-mt	·	·
lient Notification/ Resol	ution:							
Person Contacted: _			i	Date/	Гіme:	Contacted I	Bỳ:	
Comments/ Resolution:								
·								
V <sup>2</sup> C a V								

Note: Whenever there is a discrepancy affecting North Carolina compliance samples, a copy of this form will be sent to the North Carolina DEHNR Certification Office (i.e. out of hold, incorrect preservative, out of temp, incorrect containers)